

Review

## NASA Satellites Help us to Quickly Detect Forest Fires

<sup>1</sup>Relly Victoria Virgil Petrescu, <sup>2</sup>Raffaella Aversa,  
<sup>3</sup>Taher M. Abu-Lebdeh, <sup>2</sup>Antonio Apicella and <sup>1</sup>Florian Ion Tiberiu Petrescu

<sup>1</sup>ARoTMM-IFToMM, Bucharest Polytechnic University, Bucharest, (CE), Romania

<sup>2</sup>Advanced Material Lab, Department of Architecture and Industrial Design,  
Second University of Naples, 81031 Aversa (CE), Italy

<sup>3</sup>North Carolina A and T State University, USA

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### Corresponding Author:

Florian Ion Tiberiu Petrescu  
ARoTMM-IFToMM, Bucharest  
Polytechnic University,  
Bucharest, (CE), Romania  
Email: scipub02@gmail.com

**Abstract:** The main idea is that, as the forests of the planet are getting smaller, too much wood is cut and the forests are made too slow, there are also large forest fires due to excessive heat, of people arguing with the law, or simply by chance. Extinguishing fires are generally difficult, interventions being difficult anyway due to the increased fire, the heavy access of the firefighters to the forest, the wind that often attacks the fire and especially due to the late intervention of the specialized firefighters. A first aid could come from finding out the moment when such a fire broke out and instantly signaling it with modern wireless systems. Today, the planet's best surveillance system is the one made with artificial geostationary satellites, which instantly signals the outbreak of the fire. The system set up by NASA is indeed the most efficient possible. Find out quickly by the outbreak of fire the chances for him to be controlled quickly grow very much. NASA's satellite tools are often the first to detect fires that are burning in distant regions and new fire locations are sent directly to field managers around the world in a few hours of satellite travel. Together, NASA's tools, including a number built and run by the JAS NASA lab in Pasadena, California, have detected fire-fighting actions by tracking fires by providing information on fire management and stair scaling in scar scars. NASA has a fleet of earth observation tools, many of which contribute to our understanding of the Earth's fire. Satellites in orbit around the poles provide observations of the entire planet several times a day, while satellites in geostationary orbit offer rough resolution images of fire, smoke and clouds every five to fifteen minutes. "NASA's satellite, land and space survey captures the total impact of the fire on the Earth, from early detection of smoke and ecosystems to decades after the fire," said Doug Morton, a researcher at Greenbelt, Maryland. Much of the remote sensing data that NASA collects for fires is quickly available to help disaster response efforts around the world. The NASA earthquake program supports this application science and mobilizes for high-risk global events that cover a range of natural hazards - not only fires, but also earthquakes, tsunamis, floods, landslides, severe weather, winter, tropical cyclones and volcanoes. In this study we want to propose the future use of robots instead of humans for such dangerous fire-fighting interventions in a forest in flame. Robotic and automated vehicles may be prepared to take over this difficult task for man, extinguishing such a fire making it simpler and less dangerous for humans.

**Keywords:** NASA, Aircraft, Satellite, Fire locations, Pasadena, California, Detects Fire

## Introduction

NASA's satellite tools are often the first to detect fires that are burning in distant regions and new fire locations are sent directly to field managers around the world in a few hours of satellite travel. Together, NASA's tools, including a number built and run by the JAS NASA lab in Pasadena, California, have detected fire-fighting actions by tracking fires by providing information on fire management and stair scaling in scar scars (Buis, 2018).

NASA has a fleet of earth observation tools, many of which contribute to our understanding of the Earth's fire. Satellites in orbit around the poles provide observations of the entire planet several times a day, while satellites in geostationary orbit offer rough resolution images of fire, smoke and clouds every five to fifteen minutes.

"NASA's satellite, land and space survey captures the total impact of the fire on the Earth, from early detection of smoke and ecosystems to decades after the fire," said Doug Morton, a researcher at Greenbelt, Maryland.

### *Sharing Data with Partners*

Much of the remote sensing data that NASA collects for fires is quickly available to help disaster response efforts around the world. The NASA earthquake program supports this application science and mobilizes for high-risk global events that cover a range of natural hazards - not only fires, but also earthquakes, tsunamis, floods, landslides, severe weather, winter, tropical cyclones and volcanoes. Over the past two years, NASA's disaster program has stepped up infrastructure development and continued networking between international disaster response agencies and other space observation agencies around the world.

### *Satellites and Tools*

NASA has two different types of satellite systems to help track forest fires: Polar orbits and geostationary platforms. Polar Objectives such as NASA Terra and Aqua satellites and NASA-NOAA NPP Suomi offers a comprehensive view of fire and smoke worldwide twice a day.

Instead, geostationary satellites such as GOES (operated by NOAA, designed and built by NASA) exploit the Earth in an equatorial plan with a 24 h period, the same speed at which the earth rotates, a fixed length above equator. This allows geostationary satellites to provide repeated (five-minute) repeated images of a part of the globe; however, they typically have a higher spatial resolution than polar orbits, which fly at much lower altitudes (about 435 miles or 700 km above the Earth's surface).

NASA's polarized satellite instruments, which are relevant to fire monitoring and management, are described below. In addition, other satellites used for fire

forecasting and risk assessment include Gravity Recovery and Climate Experiment (GRACE), Global Precipitation Measurement (GPM) and passive active satellites (SMAP).

Finally, the rear-space map connects Landsat data with Sentinel-2 satellite from the European Space Agency, along with the MODIS and Infrared Radiation (VRS) tools. The assessment of post-fire damage to human and natural systems is a key component of understanding the potential for landslides and landslides, as well as the influence of changing the frequency and severity of fires.

### *The ASTER Tool*

Advanced Radiation and Advanced Radiation (ASTER) travel to NASA Terra Satellite. With spectral bands in the visible infrared wavelength region and its high spatial resolution of about 15 to 90 meters, the ASTER image of the Earth's image and the map of the planet map. The broad aspect of the ASTER spectrum gives scientists a multitude of disciplines with critical information for surface mapping and monitoring of dynamic conditions and time changes. False ASTER composite images are created using near-infrared and infrared wavelengths, each with different characteristics, such as smoke, active shots and soil surfaces. The ASTER Science Team in the U.S. is located at JPL (Buis, 2018).

### *AIRS Tool*

Data from the AIRS instrument, built and run by JPL on NASA Aqua Spacecraft, provides a glance at global concentrations and on the transport of carbon monoxide pollutants in the fire. Various AIRS image bands can be combined to provide a false composite image to show concentrations and temperatures of carbon monoxide. The highest concentrations of carbon monoxide are displayed in yellow and red in AIRS images.

AIRS is sensitive to carbon monoxide in the middle troposphere at heights between 2 and 10 km, with a maximum sensitivity at an altitude of approximately 5 km. Strong winds at these altitudes favor long-distance transport of high-temperature pollution caused by fires.

### *The MISR Tool*

The tool built and managed by JPL, which uses the NASA Satellite Spectrum Analyzer (MISR), also provides unique information on smoke characteristics. MISR has nine chambers, each viewing another earth to determine the height of the smoke over the surface in the same way that the two eyes, indicating a slightly different way, give a deep perception. Height is an important parameter that regulates the extent to which smoke particles move into the atmosphere. Particulate injection at higher altitudes generally influences the air quality at the source. The multi-angled observation

strategy of the MISR also allows the estimation of certain concentrations of smoke in the air. Inhalation of these particles increases the risk of cardiovascular and respiratory diseases (Buis, 2018).

## Materials and Methods

### *The CALIOP Tool*

Cloud-Aerosol Cloud-Aerosol (Calibrator) from Cloud-Aerosol (Calibo) Cloud-Aerosol (Calibrator) provides information about the height of the smoke injection and the vertical distribution of aerosols to the atmosphere. These lidar data are unique in their ability to detect fine layers of optical smoke at a fine vertical resolution and CALIOP is able to visualize smoke-free smoke without clear boundaries. When combined with models, this tool is capable of providing new information, such as attributing a smoke stream from numerous fires and the height of the evolution of injection smoke one day, which has implications for the climate (transportation and storage of black smoke on snow and ice, albedo), air quality and human health.

### *The MODIS Tool*

The MODIS instrument flies aboard two NASA satellites: Terra and Aqua. MODIS provides daytime visible images and real-time images overnight.

In images, the active burning of areas or hot spots detected by the MODIS thermal bands is shown in red. Each hot spot is an area where the MODIS instrument's thermal detectors have temperatures better known than a background. Such hot spots are fire diagnosis, with or without smoke.

MODIS images may also be false to show the extent of the burned areas, the red color of the brick in the false images (Buis, 2018).

### *The MOPITT Tool*

The specific objective of the NASA Territory Measurement Tool in the Troposphere instrument (MOPITT) relates to the distribution, transport, sources and sinking of tropospheric carbon monoxide. Carbon monoxide, which is expelled from factories, machinery and forest fires, prevents the natural ability of the atmosphere to escape harmful pollutants.

### *The VIIRS tool*

NASA-NOAA, the Suomi satellite in Suomi, provided day and night imagery of fires. VIIRS is the smallest MODIS sister and offers inferior spatial resolution (1,230 feet or 375 feet). The daytime display indicates both the size of the smoke and the heat generated by the fire.

Also, "VIIRS" Day/Night Lane gives you a glimpse into the heat of the fire at night. It detects light in a range

of wavelengths from green to near infrared and uses filtering techniques to detect signals such as city lights, gold and fires (Buis, 2018).

### *Aircraft*

NASA has a fleet of research aircraft carrying the latest sensory technologies that can be used to observe the Earth. NASA ER-2, based at Armstrong Flight Research Center (AFRC) in Palmdale, California, flies at a distance of 21,300 meters, almost twice as large as a commercial airplane and is used for scientific research missions at world level. In December 2017, the plane flew locally over the California fire events, testing previous versions of scientific instruments that could be launched one day into space on a satellite to observe our planet Earth.

### *AVIRIS Tool*

During the December flight tests, ER-2 wore an embedded JPL spectrophotometer called infrared/infrared spectrometer (AVIRIS-classic). AVIRIS is a modern sheet that demonstrated the ability to estimate fuel for plant types (e.g., vegetation and species density) and fuel status (live and dead vs. wet). Because it provides a full spectral signature of the landscape, the imaging, which covers the visible infrared, can provide a complete fingerprint of the imaging area and can be used to estimate the fire temperature.

### *HyTES and MASTER*

Hyperspectral thermal emission spectrometer (HyTES) and MODIS/ASTER (MASTER) air simulator are both flying instruments on different aircraft. HyTES is a new JPL imaging spectrometer developed by JPL. The overall goal of the HyTES project is to provide a precursor (temperature) precursor of the thermal space precursor in the high resolution spectrum.

The products produced provide temperature, emissivity and gas detection. HITES can be used to effectively detect and characterize the space structures of each methane, hydrogen sulfide, ammonia, nitrogen dioxide and sulfur dioxide. MASTER in air collects data sets, such as ASTER and MODIS, to validate ASTER and MODIS satellite data.

### *Synthetic Synthetic Membrane without VAV (UAVSAR)*

UAVSAR built and managed by JPL is a fully polarimetric radar tool operating in the microwave portion of the electromagnetic spectrum. It is an active sensor that transmits polarized electromagnetic pulses that interact with soil coverage in complex but quantifiable modes, allowing the characterization of changes in the Earth's surface through clouds, smoke and dust. UAVSAR has been used to estimate fire coal and fire scars, with particular success in certain plant cover

types, such as chaparral. The changes associated with these fires are detectable by UAVSAR for many years, allowing for the ability to monitor the long-term regeneration of vegetation after a fire. UAVSAR is an air testing platform for the NISAR orbital instrument, a joint mission with the Space Research Organization of India to be launched in 2021.

#### *International Space Station*

Astronauts on board the International Space Station have a unique visibility point and provide video cameras and video images of fire and smoke while orbiting the Earth. These ISS datasets also contribute to the continuous monitoring and monitoring of fire libraries and other Earth phenomena that scientists and fire managers use daily on Earth to make effective discoveries and to help manage crisis situations.

All these satellite and air systems, combined together in a web sensor, give us a better understanding of the role and extent of fires on our planet (Buis, 2018).

NASA maintains the NASA Fire and Smoke page, where many of the products are posted with updates on various incidents around the world (Aversa *et al.*, 2016a; 2016b; 2016c; 2016d; 2017a; 2017b; 2017c; 2017d; 2017e; Mirsayar *et al.*, 2017; Petrescu *et al.*, 2016a-b; 2017a-ae).

#### *Results (The Most Devastating Fires in the World in Recent Years)*

The vegetation fires that have so far caused the deaths of at least 96 people in Australia are the worst in the history of the country and the most devastating in the world since 2000.

AFP shows the main fires in the world since 2000 and to date, notes NewsIn.

#### *July-August 2000, UNITED STATES*

13 people die in dozens of fires that are raging in the west of the country. At least 560,000 hectares of land are destroyed by flame.

#### *January 2003, AUSTRALIA*

Several areas on the outskirts of Canberra are devastated by forest fires, lasting a month and causing the deaths of four people. Approximately 530 homes are destroyed and 800,000 hectares are affected in Victoria.

#### *April 28, 2003, RUSSIA*

Strong forest fires affect 36,000 hectares of land in the Siberian region of Cita, east of Baikal Lake. On May 3, 12 people, including four journalists, die in the Mi-26 helicopter crash, used to fire.

#### *August 15, 2003, SPAIN*

Several forest and vegetation fires destroy in a few days over 36,000 hectares in the southwest and west of the country. Five family members die in a forest fire at

Sant Llorenç Savall, near the Sant Llorenç del Munt natural park in Catalonia (Ziare.com, 2009).

#### *October 21, 2003, UNITED / MEXICAN STATES*

About 17 outbreaks of forest fires devastate California and cause the deaths of 22 people, two of which in Mexico, 300,000 hectares are damaged, 100,000 people evacuated and 3,576 homes destroyed in 14 days' fires.

#### *May 14-16, 2004, RUSSIA*

New people die and 5,000 hectares of forest and nearly 400 homes are destroyed in the Kurgan, east of the Ural Mountains.

#### *January 12, 2005, AUSTRALIA*

New deaths, dozens of injured and 80,000 hectares of land destroyed in the south of the country in the most powerful forest fires in the last 20 years.

#### *July 17, 2005, SPAIN*

11 volunteer firefighters die in fires that destroy 13,000 hectares in the Guadalajara region in the center of the country.

#### *July 9, 2006, PORTUGAL*

Six firefighters, five of whom come from Chile, are trying to extinguish the forest fire from Sao Famalicao da Serra.

#### *August 22 - September 4, 2006, UNITED STATES*

Hundreds of people are evacuated in Montana, where a heavy fire devastates nearly 730 square kilometers of land, but has not resulted in any victim.

Forest fires were raging Thursday around a city in western Canada, where thousands of people had to leave their homes starting on Saturday (Monday, July 20, 2009).

"More than 10,000 people have been evacuated (...) and over 6,000 are preparing to do the same," said Jenelle Turpin, responsible for emergency operations in Kelowna, a city with over 100,000 inhabitants located 400 km east of Vancouver, informs AFP.

Three fires broke out on Saturday in the pine covered mountains that surround the city, on both sides of Lake Okanagan, a wine-growing center in western Canada. The flame destroyed "at least three houses" and over 1,400 hectares of forest, Turpin said, but there were no dead or injured.

The fires, which may have been caused by human negligence, are fed by strong winds, high temperatures and dry weather.

More than one hundred experts and local firefighters tried to quench the fire, helped by 12 helicopters and planes.

One of the most threatening fires was under control in a 40% proportion, but the authorities fear that the

wind will replenish flames again. The weather forecast provides a warm and dry weather for several days, with temperatures of nearly 35 degrees Celsius.

An Italian pastor was discovered dead in Sardinia on Thursday after a forest fire and an animal breeder was fallen out of another fire, Italy's Italian Civil Protection said on Thursday (July 23, 2009).

In the northern island of Sassari, a 58-year-old pastor, Mario Piu, died in Pozzomaggiore as he tried to save his flock, AFP said.

A farmer in the town of Semestene, near Sassari, was missing.

The heat wave - temperatures reached 46 degrees Celsius in some parts of Sardinia - and the hot wind caused the first forest fires of the season.

During the afternoon, both in the south and north of the island, the authorities evacuated several homes threatened by flame.

In the southwest of the island, at Capo Pecora, three helicopters and four Civil Protection vessels evacuated 120 swimmers from a beach.

In the summer of 2008, four people died in fires and in 2007 12 people.

More than 900 hectares of forest are affected by fires in Siberia, the regional center of the Ministry for Emergency Situations announced on Monday.

"There are 38 outbreaks of fires on an area of 917.3 hectares of forest. Thirteen of them, on an area of 705.8 hectares, have been controlled," said the center's representatives, according to RIA Novosti.

Fires are mainly concentrated in eastern Siberia.

Fires in Russia are used especially during the summer without precipitation and extremely decalous, but also autumn. Most incitements are caused by the neglect of the locals.

The forest fires affected several regions of central Russia in 2010, when 62 people lost their lives and a few thousands left homeless.

Two fires continued furiously in the early hours of Tuesday morning in France, causing the shutdown of the A50 (Tuesday, 31 August 2010).

Pine forests and bushes burn in the northern part of Montpellier (Herauld) and near La Ciotat (Bouches-du-Rhone) and to date there have been no reported casualties, says Le Monde.

Thus, a total of almost 3,000 hectares of vegetation were made out of the fires produced.

The magnitude of fires is increased by the strong winds in the north and during the night the fire has expanded rapidly, destroying more than 2,000 hectares of pine and bushes.

In the Guzargues area, four houses burned, flames approaching the industrial areas of Assas and Teyran.

In the early hours of the morning, more than 800 firefighters are engaged in firefighting in the departments

of Languedoc-Roussillon and Auvergne, the French using waterplanes.

Near La Ciotat, 600 firefighters from Bouches-du-Rhone, Alpes-Maritimes and Var fight fires as early as Monday evening.

Wind speeds of more than 80 km per hour have rapidly expanded fires to another 220 hectares, up to the A50 motorway, which had to be closed for traffic on Tuesday morning.

French firefighters hope to temper the fury of forest fires, especially as METEO France's predictions are favorable, starting on Tuesday, when strong winds are expected to reduce their intensity.

Bulgarian firefighters struggle to put out not less than 37 fires in Bulgaria, the Interior Ministry announced on Wednesday. The most affected are the communes of Etropole and Teteven (Thursday, November 11, 2010).

More than 450 firefighters are on the scene to quench the flame, says Sofia Echo.

In addition, policemen, foresters and volunteers participate in operations.

The forest fires in the Stara Planina mountain range have been aggravated by strong wind gusts, causing significant damage to both flora and fauna.

Six fires affect the Sofia region and the Loveci area.

About 90 firefighters fight fires in the Ostroma region.

The flames also spread to the villages of Lipnitsa, Bozhenitsa, Lessidren, dozens of firefighters being on the spot to remove the danger.

Weather news is not the best, as the strong wind will continue on Thursday.

The forest fire broke out in the Carmel Mountains of Israel continues to expand, with the sale of the border now being located just a kilometer out of Haifa's outskirts. The fire is the largest in Israel's history and flames seem unstoppable (Saturday, 04 December 2010).

The fire jeopardizes the Denia neighborhood and the Technological Institute of Technology writes Al Jazeera. The fight against fire is made heavy by the strong blows that sell out the flames and create new outbreaks.

Following the catastrophe, 41 people died, 17 suffered a serious injury and another 17,000 were evacuated. Firefighters have also been evacuated from the Carmel Forest Hotel, located near the reserve where fire is raging.

The zoo employees in the reserve were also evacuated, but the animals could not be moved to another place.

They were left in the will of fate, the only help being that they left the doors of the open cages.

On the outskirts of Haifa, there are dozens of chemical enterprises in the threatened area of fire, CNN said.

Prime Minister Benjamin Netanyahu called for international aid, with Israel not having the necessary equipment to deal with the catastrophe.

Russia sent an Il-76 aircraft, which landed on Ramat David on Friday. It is possible that a plane can

carry up to 42 tons of water or fire-extinguishing liquid on a single flight.

He also participates in the firefighting efforts in Israel and Greece, Cyprus, Romania, United Kingdom, Turkey, France, USA, Italy, Spain, Switzerland, Croatia and Azerbaijan. Bulgaria sent a group of 93 firefighters, several fire brigades. Fire-fighting materials sent Jordan to Jordan and Egypt.

It is the biggest calamity in Israel's history. It is estimated that it will take at least 40 years to restore the area affected by the flame. According to the first information, the fire originally broke into an unauthorized landfill. A premeditated act is also taken into account.

However, very hot weather, dry and strong winds have contributed?" to the amplification of the disaster.

US Texas faces a series of devastating forest fires that have burned over 1 million acres of forest land so far and are approaching one of the most important cities, Forth Worth (Wednesday, April 20, 2011).

Several smaller cities have already been evacuated and nearly 200 homes have already been destroyed, CNN informs.

The firefighters intervened by all means, even with the help of planes that throw water over the fire, but they cannot stop the flame advance. "Texas burns from the border to the border," firefighter spokesman April Saginor said.

Firefighters from 34 other US states came to the aid of Texas firefighters, out of a total of 50, but conditions are particularly difficult. Very dry weather and very strong winds favor the extremely rapid expansion of fires, which in some areas, such as Dallas, join in huge fires.

But those who fight fire may have some help from nature, as Wednesday or Thursday is expected rain in the Southwest US state.

Texas has faced fires since December last year in 252 of its 254 regions.

More than 300 firefighters, backed by helicopters struggled Saturday to extinguish 32 forest fires in the Principality of Asturias (northern Spain), while another fire affecting a natural park in Galicia (northwest), announced the Spanish authorities.

"The emergency services in Asturias fought for the fifth consecutive day against 107 forest fires, of which 32 remain active," firefighters announced in a statement.

A spokesperson for firefighters was unable to state how many hectares are affected by fire, "helicopters having the sole task of circumscribing fires" in the affected area.

In total, "320 people were called to fight fires" with the support of seven helicopters and an airplane, a statement said.

To the west, over 200 people were evacuated from their homes because of a fire that broke out in the evening in the natural park Fragas do Eume in Galicia,

destroying 200 hectares of protected area due to the richness of its ecological announced authorities.

Five fire brigades, supported by four tanks, five helicopters and four airplanes, were participating in the operations to fight this fire, they said.

According to the meteorologists, Spain has been facing the driest winter since the 1940s. Vegetation suffers from drought and forest fires, frequent in spring, began a few months earlier than usual.

According to the Spanish Ministry of Agriculture, between January 1 and February 29, in Spain there were 3,092 forest fires, an increase of 55.3 percent compared with the average in the same period in the last ten years.

The affected area was up to 13,542 hectares, up 24.1 percent from the average. Since then, many fires have been recorded in different regions of the country.

In March 2012, dozens of firemen from the detachments of Hunedoara and Petrosani, supported by representatives of the Hateg Forestry, fought on Thursday with the fire of forest that broke out on Wednesday in the Sureanu Massif, Romania.

According to the head of ISU, Viorel Demean, more than 100 firefighters, representatives of the Hateg Forestry Center, gendarmes and members of the Voluntary Emergency Service Hateg acted on Wednesday more than 6 h for the liquidation of the fire propagated at about 50 hectares pine and beech forests in Santamaria Orlea area.

"The intervention teams performed fire-isolation strips that consisted of removing dried leaves and branches from the ground and intervened with rubber shovels and other specific means for limiting burning.

The fire has developed into an inaccessible area of water and foam, the work of intervention teams being hampered by rough, hard-to-reach land and by the strong wind that favored the rapid spread of burning," said Demean.

During the night, the fire area was supervised by the representatives of the Hateg Forestry and the firefighters believe that the fire was most likely generated by the use of fire open in the open air for the purpose of sanitation of agricultural land or pastures.

Only in one day, more precisely on Wednesday, the Hunedoren firefighters were involved in 30 dry-running firefighting actions, affecting 265 hectares of land, 80 of which are forest litter and 50 forestries.

In total, in the last 28 days, the Hunedoren firefighters intervened to liquidate 788 dry fallow vegetation, which spread to about 5,021 hectares, of which 1,376 hectares are the forest litter and 50 hectares of pine forests and beech.

Despite the fines recently applied by Hunedoara firefighters, farmers continue to use open-air fire to clean up the land. Until now, ISU employees have applied 18 contravention sanctions worth 18,000 lei.

## Discussion

Such examples could continue. The main idea is that, as the forests of the planet are getting smaller, too much wood is cut and the forests are made too slow, there are also large forest fires due to excessive heat, of people arguing with the law, or simply by chance.

Extinguishing fires are generally difficult, interventions being difficult anyway due to the increased fire, the heavy access of the firefighters to the forest, the wind that often attacks the fire and especially due to the late intervention of the specialized firefighters.

A first aid could come from finding out the moment when such a fire broke out and instantly signaling it with modern wireless systems.

Today, the planet's best surveillance system is the one made with artificial geostationary satellites, which instantly signals the outbreak of the fire.

The system set up by NASA is indeed the most efficient possible. Find out quickly by the outbreak of fire the chances for him to be controlled quickly grow very much.

In this study we want to propose the future use of robots instead of humans for such dangerous fire-fighting interventions in a forest in flame. Robotic and automated vehicles may be prepared to take over this difficult task for man, extinguishing such a fire making it simpler and less dangerous for humans.

## Conclusion

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Robotic and automated vehicles may be prepared to take over this difficult task for man, extinguishing such a fire making it simpler and less dangerous for humans.

Besides aviation and robots, today humans are helped to extinguish the forest fires and the satellite planet surveillance system.

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## Author's Contributions

All the authors contributed equally to prepare, develop and carry out this manuscript.

## Ethics

This article is original and contains unpublished material. Authors declare that are not ethical issues and no conflict of interest that may arise after the publication of this manuscript.

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